

## **Historic, Archive Document**

Do not assume content reflects current scientific knowledge, policies, or practices.





Reserve  
aSB117  
.U53

U.S. DEPT. OF AGRICULTURE  
NATIONAL AGRICULTURAL LIBRARY

610

OCT 2 1979

CATALOGING = PREP.

# NATIONAL SEED STORAGE LABORATORY

Fort Collins, Colorado



U.S. AGRICULTURAL  
RESEARCH  
SERVICE

WESTERN REGION

UNITED STATES  
DEPARTMENT OF  
AGRICULTURE



AD-33 Bookplate  
(1-63)

**NATIONAL**

**A  
G  
R  
I  
C  
U  
L  
T  
U  
R  
A  
L**



**LIBRARY**



## NATIONAL SEED STORAGE LABORATORY

### FOREWORD

Not a single major food or fiber plant grown in the United States today originated here. Without exception, the plants were "introduced" from elsewhere. Over the years many of these plants were modified and improved, but no adequate provisions were made for the preservation of original seed stocks. Consequently, our agricultural history is replete with losses of valuable and usually irreplaceable germplasm.

It was to preclude continued loss of precious germplasm that the National Seed Storage Laboratory was born. Now, seed stocks are preserved in the world's largest collection of agricultural seeds, to serve research needs in perpetuity for the ultimate benefit of all people.

October 1958 marked the completion of the National Seed Storage Laboratory (NSSL), Fort Collins, Colo., which was established by an act of Congress during its 1956-57 session. The idea for a NSSL originally was conceived by the National Research Council, which had the support of various Federal, State, and private agencies, all of whom recognized the vital need for such a facility.

With the opening of the Laboratory, a national storage program for the permanent preservation and conservation of seed stocks was available for the first time in the history of U.S. agriculture.

The NSSL is a specially designed three-level structure situated on the Colorado State University campus. The building houses various research laboratories, growth chamber rooms, seed storage rooms, a workshop, library, and administrative offices. The seed storage rooms can handle as many as a half million seed lots. Presently, more than 95,000 samples are in storage under carefully controlled temperature and humidity environments.

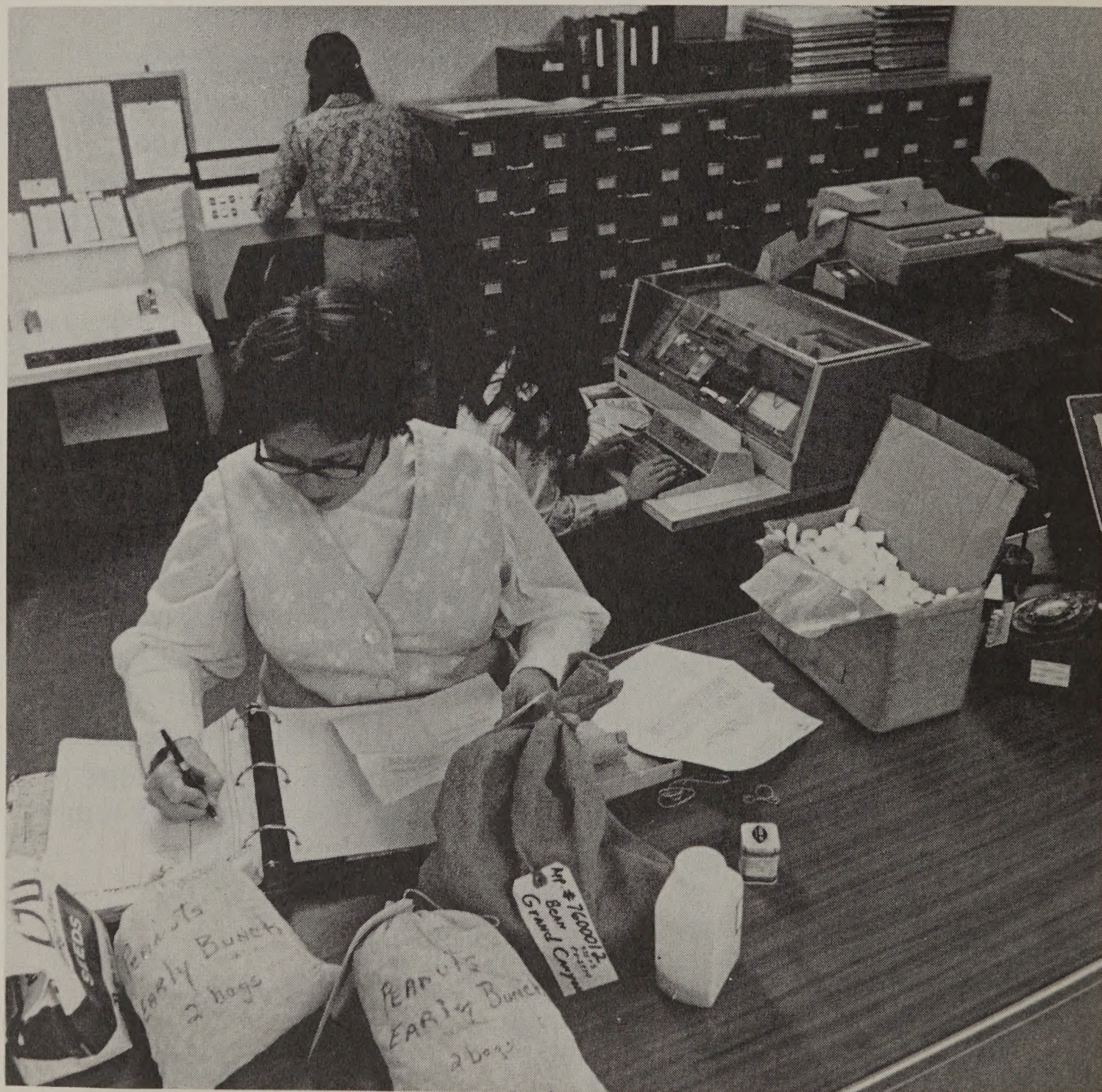


## MISSION

Basically, the NSSL has a two-fold mission: 1) to preserve valuable seed stocks; and 2) to conduct research on aspects of seed viability and storage.

Preservation of germplasm is accomplished through the collection of seeds of known value. All agronomic, horticultural, forest, and esthetic types qualify for storage, includ-

ing obsolete varieties, current varieties, breeding lines, and genetic stocks. Only the seeds are stored and then only after tests prove them to be capable of growing and developing. Once accepted in the Laboratory, the seeds become the property of the Federal Government. The NSSL regularly publishes inventories of its seed stocks. The seeds are available to researchers in the United States when it is con-



Incoming seeds are cataloged and all pertinent information is prepared for storage in a computer data bank.



## MAJOR

## ACCOMPLISHMENTS

Since 1958, the Laboratory researchers have:

firmed that the Laboratory is the only known source of the needed germplasm. Also, under special conditions, seeds are accepted from and provided to foreign scientists.

After the original germination test at incoming and acceptance time, the seeds are continually tested at periodic intervals. When deterioration is discovered, a seed-producing agency is contracted to replenish the stocks with seeds from controlled plantings of present stocks. Under the conditions used, regeneration generally is not required sooner than 10 to 20 years after initial storage.

The NSSL also provides back-up storage for the working stocks in the four Regional Plant Introduction Stations as well as the working stocks in world collections such as wheat, oat, barley, buckwheat, flax, soybean, rice, sorghum, and tobacco.

The crop characteristics of all seeds stored are recorded on accession cards and the data are fed into computers at the USDA Computer Center, also in Fort Collins. This system provides researchers a means of locating seeds having desirable or needed traits.

- Acquired for permanent storage thousands of seed samples representing more than 600 genera and 1,300 species, including all major United States crops;
- Converted the germplasm documentation from a manual to an automated data processing system;
- Developed improved procedures for germplasm storage, which will more than double the storage life of individual seed samples;
- Designed and built a high-capacity seed blower for use in preparing germplasm samples for storage;
- Established that there are significant varietal differences in the storability of several kinds of vegetable seeds;
- Determined the suitability of various materials as containers for seed storage and preservation;
- Ascertained suitability of air versus various gases as a suitable medium in which to store seeds;



- Developed a low temperature technique for delaying the development of physiological necrosis in lettuce seeds during storage;
- Discovered the importance of bean seed moisture content at planting time in overcoming low temperature germination stress.

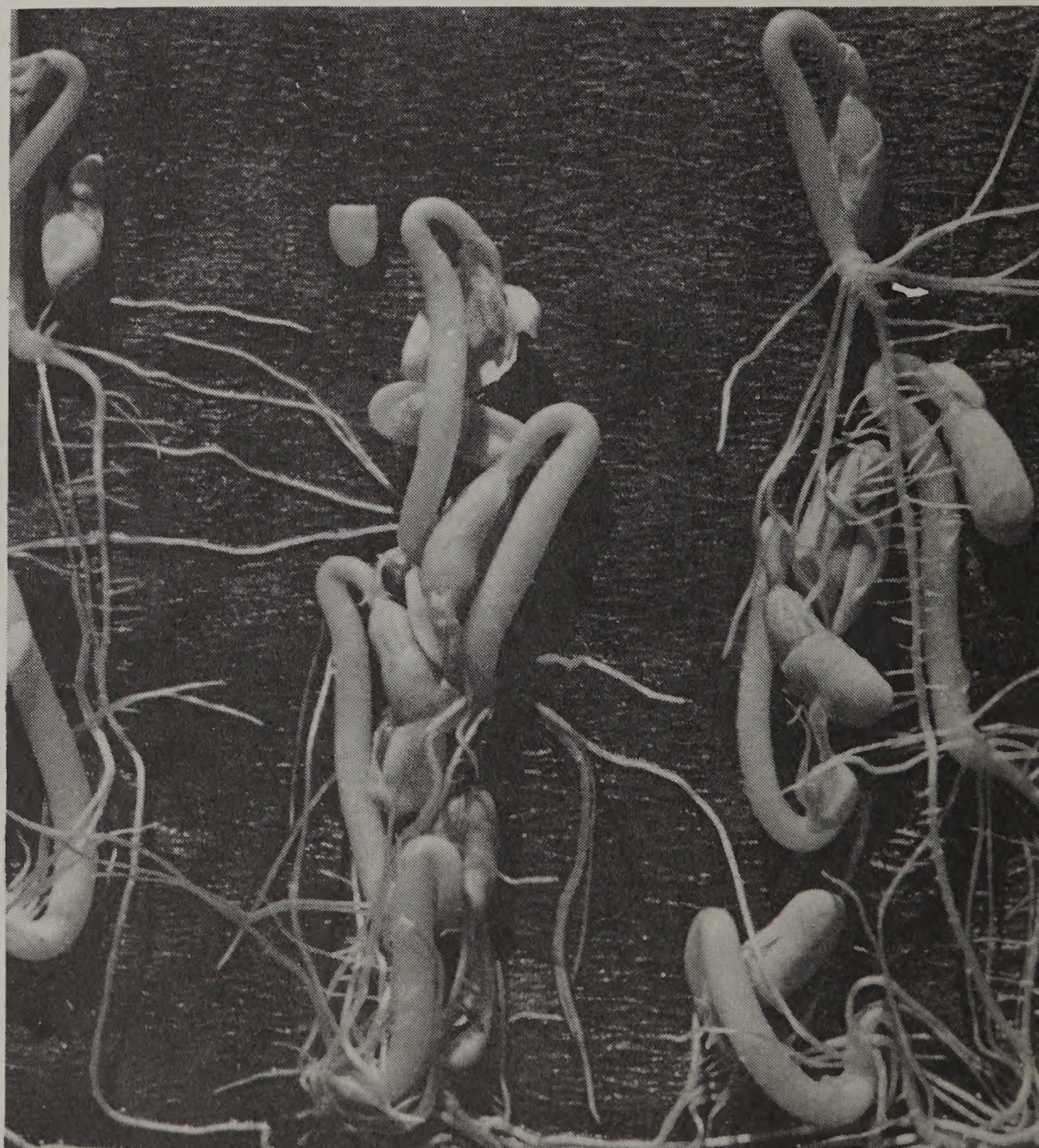
## CURRENT RESEARCH

Besides continuing their search for and acquisition of varieties and valuable breeding lines in danger of being lost, researchers at the Laboratory are conducting studies on the effects of:

1) various storage conditions on the viability and vigor of seeds of various vegetable and field crops; 2) very cold temperatures  $-70^{\circ}$  to  $-196^{\circ}$  C (liquid nitrogen) on seed longevity; 3) singulation treatments on germination and vigor of lettuce seeds; and 4) genetic changes in seeds during storage, such as differential deterioration of isogenic lines, chromosomal aberrations in de-

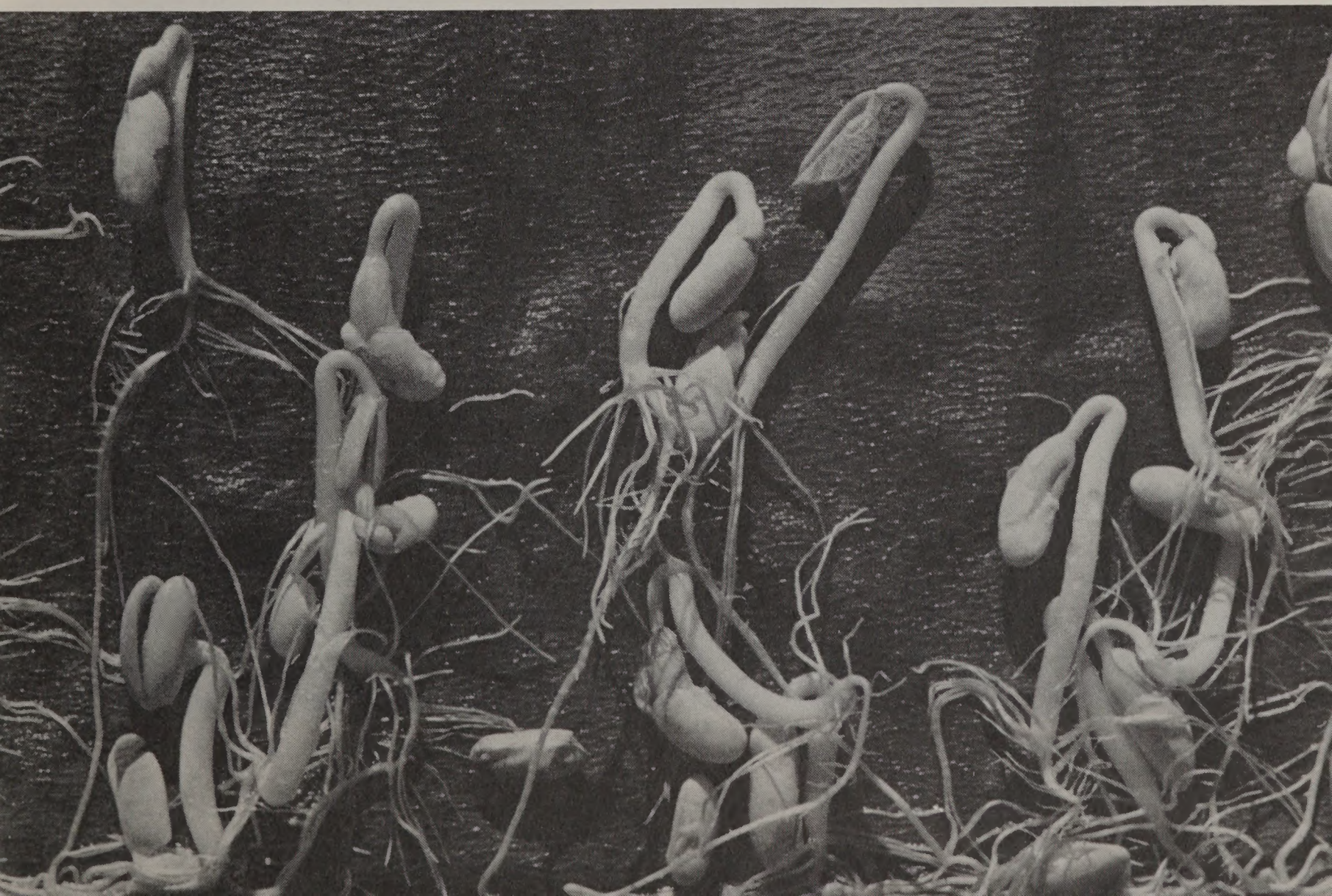
teriorating seeds, and population shifts resulting from repeated cycles of deterioration and re-growing. The researchers also are looking for suitable storage conditions for seeds of various potential new crop species.

Closeup of bean germination test, showing normal seedlings and ungerminated seeds.



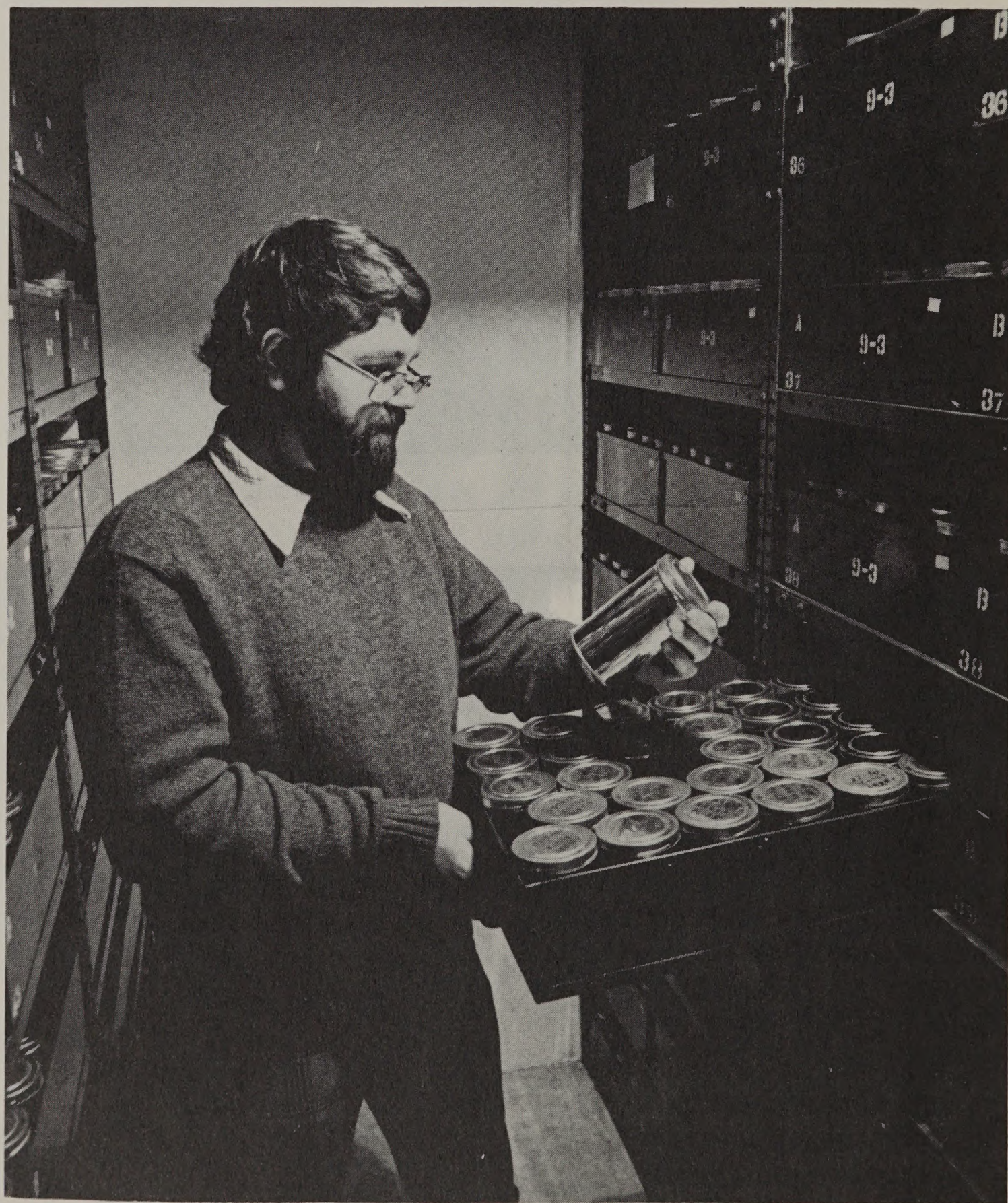


Seed is tested for viability in walk-in germinating rooms.

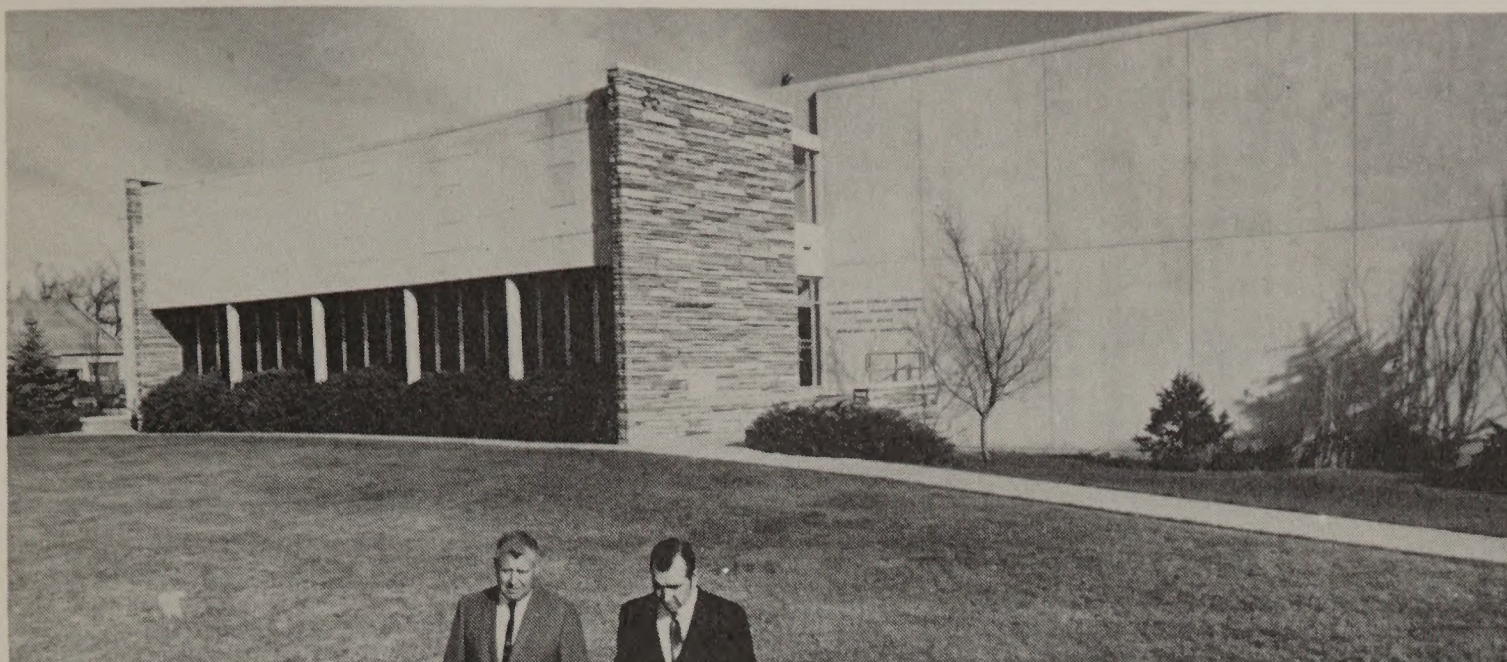




Many thousands of seed containers—  
each labeled as to serial number, kind  
of seed, and storage location—are  
housed in NSSL seed storage rooms.







## VISITORS AND INFORMATION

Visitors are welcome at the National Seed Storage Laboratory. However, tours should be arranged as far in advance as possible by contacting:

**Research Leader, ARS-USDA  
National Seed Storage Laboratory  
Colorado State University  
Fort Collins, CO 80523  
Telephone: 303/484-0402**

Business hours are from 8:00 a.m. to 4:30 p.m., Monday through Friday, except holidays.

Any questions regarding agricultural research at this facility may be directed to the above address. Questions about ARS research elsewhere in the Western Region, or anywhere throughout the Agency, may be directed by mail or phone to:

**Area Director, ARS-USDA  
Colorado-Wyoming Area  
Room 406, Federal Building  
P. O. Box E  
Fort Collins, CO 80522  
Telephone: 303/484-5272**





AGRICULTURAL  
RESEARCH  
SERVICE

The Agricultural Research Service (ARS), largest agency of its kind in the world, is the principal research arm of the United States Department of Agriculture. Its primary mission is to help in meeting the food and fiber needs of our Nation.

ARS research is conducted here in Fort Collins and at more than 150 other laboratories, field stations, and work sites in 46 States, the District of Columbia, Puerto Rico, the Virgin Islands, and nine foreign countries. ARS researchers work in close cooperation with State experiment stations, State departments of agriculture, other government agencies, public organizations, and with growers, packers, transporters, receivers, and others in the food industry.

The Agency is administered in four major geographic regions that subdivide the country. Colorado and 11 western States, including Hawaii, comprise the Western Region (WR). The WR is further subdivided into six administrative units—five Areas and the Western Regional Research Center.

This structure is designed to provide an aggressive research program with maximum responsiveness to the needs of publics served.

Issued November 1977







